IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): An exposure method to transfer a pattern of a mask illuminated with exposure light from a light source onto a substrate through an optical system, said method comprising:

~~setting a time interval for measurement of a transmittance of said optical system;~~

setting an exposure condition for transferring said pattern of said mask onto said substrate;

~~changing said time interval for measurement in consideration of a transmittance of said optical system that changes depending~~ setting a time interval for obtaining both of a detection result of a part of said exposure light between said light source and said mask and a detection result of said exposure light having passed through said optical system, based on said set exposure condition;

~~measuring a transmittance of said optical system at said changed time interval for measurement;~~

setting an exposure amount control target value ~~in accordance with said measured transmittance of said optical system~~ with respect to said substrate based on both of said obtained detection results; and

transferring said pattern onto said substrate through said optical system, while an exposure amount of said exposure light with respect to said substrate is controlled based on ~~a photodetection~~ the detection result of a part of said exposure light ~~photodetected~~ detected between said light source and said mask and said set exposure amount control target value, wherein

said time interval is changed when the setting of said exposure condition is changed.

Claims 2-3 (Canceled).

Claim 4 (Previously Presented): An exposure method according to Claim 1, wherein said exposure condition includes a transmittance of said mask.

Claim 5 (Previously Presented): An exposure method according to Claim 1, wherein said exposure condition includes one of a minimum line width of said pattern and a permissible exposure amount error.

Claims 6-13 (Canceled).

Claim 14 (Currently Amended): An exposure method to illuminate a mask with exposure light from a light source and transfer a pattern of the mask onto a substrate through an optical system, said method comprising:

setting time intervals ~~for measurement in respect~~ each corresponding to at least two exposure conditions for transferring said pattern of said mask onto said substrate, ~~each of~~ said time intervals ~~for measurement being different from one another, in consideration of a transmittance of said optical system that changes depending on each of the at least two exposure conditions~~ being for obtaining both detection results of a part of said exposure light between said light source and said mask and of said exposure light having passed through said optical system;

storing said set time intervals in a memory;

setting one exposure condition of said at least two exposure conditions; ~~and~~

calling up said time interval corresponding to the set one exposure condition from the memory;

obtaining both detection results of a part of said exposure light between said light source and said mask and of said exposure light having passed through said optical system, based on the called up time interval; and

controlling an exposure amount of said exposure light with respect to said substrate based on said obtained both detection results.

~~measuring an amount of said exposure light which passes through said optical system and reaches onto said substrate at said time interval for measurement that corresponds to said set exposure condition.~~

Claim 15 (Currently Amended): An exposure method according to Claim 14, wherein said at least two exposure conditions include at least one of an illumination condition to illuminate ~~a~~ said mask, a transmittance of said mask, a minimum line width of a pattern formed on said mask, and a permissible exposure amount error of said exposure light with respect to said substrate.

Claim 16 (Currently Amended): An exposure method to transfer a pattern illuminated with exposure light from a light source onto a substrate through an optical system, said method comprising:

performing a first measurement ~~of~~ in which both of an amount of a part of said exposure light between said light source and said mask and an amount of said exposure light ~~passing~~ having passed through said optical system are measured;

performing a second measurement ~~of~~ in which both of an amount of a part of said exposure light between said light source and said mask and an amount of said exposure light ~~passing~~ having passed though said optical system are measured at a predetermined time interval after said first measurement ~~of the amount of said exposure light~~;

comparing ~~the amount of said exposure light~~ a transmittance of said optical system obtained based on a ratio between the amount of a part of said exposure light and the amount of said exposure light having passed through said optical system measured in ~~obtained by~~ said first measurement and ~~the amount of said exposure light~~ a transmittance of said optical system obtained based on a ratio between the amount of a part of said exposure light and the amount of said exposure light having passed through said optical system measured in ~~obtained by~~ said second measurement; and

obtaining a time interval for measurement for measuring both of an amount of a part of said exposure light between said light source and said mask and an amount of said exposure light ~~passing~~ having passed through said optical system in third and succeeding measurements, in accordance with the comparison result.

Claim 17 (Original): An exposure method according to Claim 16, wherein said first and second measurements are performed prior to starting of exposure.

Claim 18 (Original): An exposure method according to Claim 16, wherein said first and second measurements are performed after starting of exposure.

Claim 19 (Currently Amended): An exposure method performed by an exposure apparatus to transfer a pattern illuminated with exposure light from a light source ~~with exposure light~~ through an optical system onto a substrate, said method comprising:

a self-cleaning to clean said optical system by irradiating said optical system with said exposure light ~~on a predetermined condition prior to exposure~~ before transferring said pattern onto said substrate;

monitoring an amount of said exposure light irradiated on said optical system between said light source and said mask, while performing said self-cleaning;

a prediction function determining to determine a transmittance time-varying prediction function of said optical system in consideration of ~~said predetermined condition~~ the monitored amount of said exposure light; and

setting said exposure amount control target value based on said determined transmittance time-varying prediction function.

Claim 20 (Original): An exposure method according to Claim 19, wherein said prediction function determining takes into consideration a period of time in which the operation of said apparatus is stopped.

Claim 21 (Currently Amended): An exposure method according to Claim 19, wherein ~~said predetermined condition includes~~ an irradiation time of said exposure light on said optical system is further taken into consideration when determining said transmittance time-varying prediction function~~, said exposure light intensity, and an irradiation amount~~.

Claim 22 (Canceled).

Claim 23 (Currently Amended): An exposure method according to Claim 14, further comprising:

obtaining a transmittance of said optical system ~~in accordance with an amount of said exposure light which is measured before passing through said optical system, and said measurement result of said exposure light passing through said optical system~~ by multiplying a ratio between a part of said exposure light detected between said light source and said mask

and said exposure light having passed through said optical system by a predetermined coefficient.

Claim 24 (Currently Amended): An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said exposure apparatus comprising:

a branch optical system arranged ~~in an optical path of said exposure light~~ within an illumination optical system illuminating said pattern and configured to branch a part of said exposure light;

an optical system arranged between said branch optical system and said substrate;

a first sensor arranged within said illumination optical system and configured to detect a part of said exposure light branched by said branch optical system;

a second sensor arranged flush with a surface on which said substrate is arranged and configured to detect said exposure light having passed through said optical system;

~~a transmittance measurement unit to measure a transmittance of said optical system at a predetermined time interval;~~

a control unit connected with said ~~transmittance measurement unit~~ first and second sensors and configured to ~~change said~~ set a time interval for obtaining both of an output from said first sensor and an output from said second sensor based ~~in consideration of a transmittance of said optical system that changes depending~~ on an exposure condition for transferring said pattern onto said substrate;

an exposure amount setting unit connected with said ~~transmittance measurement unit~~ control unit and configured to set an exposure amount control target value with respect to said substrate based on both of the output from said first sensor and the output from said

second sensor ~~in accordance with a transmittance of said optical system that is measured by said transmittance measurement unit at said changed time interval~~; and

an exposure amount control system connected with said exposure amount setting unit and configured to control an exposure amount based on said set exposure amount control target value, wherein

said control unit changes said time interval when said exposure condition is changed.

Claims 25-27 (Canceled).

Claim 28 (Currently Amended): An exposure apparatus according to Claim 24, further comprising:

an information reading unit configured to read information of a mask on which the pattern is formed, ~~and~~ wherein

said control unit automatically ~~determines~~ changes said set time ~~intervals~~ interval ~~for measurement of said transmittance measurement unit~~ based on said information of said mask read by said information reading unit.

Claim 29 (Currently Amended): An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate, said exposure apparatus comprising:

a branch optical system arranged ~~in an optical path of said exposure light~~ within an illumination optical system illuminating said pattern and configured to branch a part of said exposure light;

a first sensor arranged within said illumination optical system and configured to detect a part of said exposure light branched by said branch optical system;

a second sensor arranged flush with a surface on which said substrate is arranged and configured to detect said exposure light having passed through said optical system;

a measurement unit connected with said first and second sensors and configured to obtain both of an output from said first sensor and an output from said second sensor by a first measurement, and obtain again both of an output from said first sensor and an output from said second sensor in a next measurement at a predetermined time interval after the first measurement;

~~an optical system arranged between said branch optical system and said substrate;~~

~~a transmittance measurement unit to measure a transmittance of said optical system;~~

a control unit connected with said ~~transmittance~~ measurement unit and configured to compare a transmittance of said optical system obtained ~~by a most recent measurement~~ based on the outputs from the first and second sensors measured in the first measurement and a transmittance of said optical system obtained based on the outputs from the first and second sensors measured in the next measurement ~~by a measurement performed before said most recent measurement~~, and ~~set a~~ to change said predetermined time interval ~~for transmittance measurement of said transmittance measurement unit~~ in accordance with the comparison result;

an exposure amount setting unit connected with said ~~transmittance~~ measurement unit and configured to set an exposure amount control target value ~~in accordance with said measured transmittance of said optical system~~ based on both of the output from said first sensor and the output from said second sensor; and

an exposure amount control system connected with said exposure amount setting unit and configured to control an exposure amount based on said set exposure amount control target value ~~; wherein~~

~~said transmittance measurement unit measures a transmittance of said optical system at said set time interval for transmittance measurement~~.

Claim 30 (Currently Amended): An exposure apparatus according to Claim 29, wherein ~~two sequential measurements of transmittance by said transmittance measurement unit are performed~~ said measurement unit obtains both of the output from the first sensor and the output from the second sensor prior to starting of exposure.

Claim 31 (Currently Amended): An exposure apparatus according to Claim 29, wherein ~~two sequential measurements of transmittance by said transmittance measurement unit are performed~~ said measurement unit obtains both of the output from the first sensor and the output from the second sensor after starting of exposure.

Claim 32 (Canceled).

Claim 33 (Currently Amended): An exposure apparatus according to ~~Claim 32~~ Claim 29, wherein said exposure amount control system controls said exposure amount based on said exposure amount control target value and ~~said~~ the output from said first ~~optical~~ sensor when transferring said pattern onto said substrate.

Claim 34 (Currently Amended): An exposure apparatus according to Claim 24, wherein said control unit ~~sets a~~ changes said time interval ~~for measurement of said transmittance measurement unit~~ in accordance with a transmittance of ~~said~~ a mask on which said pattern is formed.

Claim 35 (Currently Amended): An exposure apparatus according to Claim 24, wherein said control unit ~~sets a~~ changes said time interval ~~for measurement of said transmittance measurement unit~~ in accordance with one of a minimum line width of said pattern and a permissible exposure amount error.

Claims 36-39 (Canceled).

Claim 40 (Currently Amended): An exposure apparatus according to Claim 24, further comprising:

a mask stage ~~disposed between said illumination optical system and said projection optical system~~ configured to hold ~~said~~ a mask on which said pattern is formed; and

a substrate stage ~~disposed in an image plane side of said projection optical system~~ configured to hold said substrate, wherein

said optical system includes a part of said ~~an~~ illumination optical system disposed ~~in an optical path of said exposure light to illuminate said mask on which said pattern is formed with said exposure light~~ between said branch optical system and said mask, and a projection optical system ~~disposed in said optical path of said exposure light~~ configured to project said exposure light which exits from said mask onto said substrate.

Claim 41 (Original): An exposure apparatus according to Claim 40, further comprising:

a driving unit connected with said mask stage and said substrate to synchronously move said mask stage and said substrate stage in a linear direction perpendicular to an optical axis of said projection optical system.

Claims 42-44 (Canceled).

Claim 45 (Currently Amended): An exposure apparatus which comprises an exposure apparatus main body transferring ~~to transfer~~ a pattern illuminated with exposure light from a light source onto a substrate through an optical system, said exposure apparatus comprising:

a self-cleaning unit provided at said exposure apparatus main body and configured ~~which communicates with said optical system~~ to self-clean said optical system by irradiating said optical system with said exposure light ~~in a predetermined condition before starting of exposure~~ before transferring said pattern onto said substrate;

a first sensor arranged within an illumination optical system illuminating said pattern and configured to monitor an amount of said exposure light irradiated on said optical system while self-cleaning said optical system;

a calculation unit connected with said ~~unit~~ first sensor and configured to determine a transmittance time-varying prediction function of said optical system in consideration of ~~said predetermined condition~~ the result monitored by said first sensor; and

an exposure amount setting unit connected with said calculation unit and configured to set an exposure amount control target value based on said determined transmittance time-varying prediction function.

Claim 46 (Currently Amended): An exposure apparatus to transfer a pattern illuminated with exposure light from a light source onto a substrate through an optical system, said exposure apparatus comprising:

a first sensor arranged within an illumination optical system illuminating said pattern and configured to photodetect a part of said exposure light;

a second sensor provided substantially flush with a surface on which said substrate is arranged and configured to photodetect said exposure light having passed through said optical system;

a setting unit connected with said first and second sensors and configured to set time intervals each corresponding to a plurality of conditions for transferring said pattern onto said substrate, said time intervals being for obtaining both of an output signal from said first sensor and an output signal from said second sensor;

a memory connected with said setting unit and configured to store said set time intervals so that said set time intervals respectively correspond to said plurality of conditions;

~~a measurement unit to measure an amount of exposure light passing through said optical system and reaching onto said substrate at a predetermined time interval;~~

a selection unit configured to select any exposure condition among a plurality of exposure conditions for transferring said pattern onto said substrate; and

a control unit connected with said memory and said selection unit and configured to call up a time interval corresponding to ~~to change said time interval of said measurement unit in consideration of a transmittance of said optical system that changes depending on~~ said any exposure condition selected by said selection unit from the memory.

Claims 47-48 (Canceled).

Claim 49 (Original): A device manufacturing method including a lithographic process, wherein exposure is performed in said lithographic process by using said exposure method according to Claim 1.

Claim 50 (Original): A device manufacturing method including a lithographic process, wherein exposure is performed in said lithographic process by using said exposure method according to Claim 14.

Claim 51 (Original): A device manufacturing method including a lithographic process, wherein exposure is performed in said lithographic process by using said exposure method according to Claim 16.

Claim 52 (Original): A device manufacturing method including a lithographic process, wherein exposure is performed in said lithographic process by using said exposure method according to Claim 19.

Claim 53 (Canceled).

Claim 54 (Original): A device manufactured by using said exposure apparatus according to Claim 24.

Claims 55-56 (Canceled).

Claim 57 (Original): A device manufactured by using said exposure apparatus according to Claim 45.

Claim 58 (Original): A device manufactured by using said exposure apparatus according to Claim 46.

Claim 59 (Currently Amended): An exposure method according to Claim 1, wherein a part of said exposure light is branched away from said exposure light by a branch optical system arranged ~~in an optical path of said exposure light~~ between said light source and said mask, and said optical system includes a plurality of optical elements arranged between said branch optical system and said substrate.

Claim 60 (Currently Amended): An exposure method according to Claim 1, wherein a change of a transmittance of said optical system is calculated based on ~~a transmittance of said optical system measured before said exposure condition is set, and a transmittance of said optical system measured after said exposure condition is set~~ both of said detection results obtained at said set time interval.

Claim 61 (Currently Amended): An exposure apparatus according to Claim 24, further comprising:

~~a first sensor arranged in an optical path of a part of said exposure light which is branched by said branch optical system to photodetect a part of said exposure light, and~~

~~a second sensor arranged substantially flush with said substrate to photodetect said exposure light passing through said optical system; wherein~~

~~said~~ a transmittance measurement unit configured to obtain a transmittance of said optical system ~~comprises a control unit which obtains a transmittance of said optical system,~~ based on an output signal sent from said first sensor when photodetecting a part of said exposure light and an output signal sent from said second sensor when photodetecting said exposure light passing through said optical system.

Claim 62 (Currently Amended): An exposure apparatus according to Claim 45, wherein said calculation unit further considers an irradiation time of said exposure light to said optical system when determining said transmittance time-varying prediction function ~~predetermined conditions include an irradiation time of said exposure light on said optical system, an exposure light intensity, and an irradiation amount~~.

Claim 63 (Previously Presented): An exposure method according to Claim 19, wherein said time-varying function is a function expressed by

$$T = a \cdot \exp\left(\sum_{i=1}^{k} b_i t\right)$$

in which T is said transmittance of said optical system, "a" is a parameter representing a rate of change in said transmittance, and b_i is a parameter dependent on each exposure condition including an illumination condition.

Claim 64 (Previously Presented): An exposure method according to Claim 19, further comprising prior to said prediction function determining:

measuring a period of time in which said exposure apparatus most recently stops operation;

measuring an irradiation time of exposure light on said optical system in a self-cleaning operation which is performed after said exposure apparatus most recently stops operation;

measuring an exposure light intensity; and

measuring an irradiation amount.

Claim 65 (Previously Presented): An exposure method according to Claim 19, wherein environmental conditions for said optical system are measured at a predetermined time interval, and said environmental conditions are considered when transmittance time-varying prediction function is determined.

Claim 66 (Currently Amended): An exposure method according to Claim 19, further comprising:

measuring a transmittance of said optical system at a predetermined time interval, and

~~corrects~~ correcting said transmittance time-varying prediction function each time a transmittance measurement is performed.

Claim 67 (Previously Presented): An exposure method according to Claim 66, wherein said predetermined time interval of said measuring said transmittance is determined in respect to a relationship with a required exposure precision.

Claim 68 (Previously Presented): An exposure method according to Claim 66, wherein said time interval of said measuring said transmittance is

short when a rate of change in said transmittance of said optical system is large, and

long when said rate of change in said transmittance of said optical system is small.

Claim 69 (Previously Presented): An exposure method according to Claim 59, wherein said optical system includes a part of an illumination optical system to illuminate said mask and a projection optical system to transfer said pattern onto said substrate.

Claim 70 (Currently Amended): An exposure method according to Claim 69, wherein a transmittance of said optical system is ~~a ratio between a photodetection result of a part of said exposure light photodetected between said light source and said mask, and a photodetection result of said exposure light passing through said optical system~~ obtained based on a ratio between said both detection results.

Claims 71-72 (Canceled).

Claim 73 (Previously Presented): An exposure method according to Claim 14, wherein said optical system includes a part of an illumination optical system to illuminate said mask and a projection optical system to transfer said pattern onto said substrate.

Claims 74-76 (Canceled).

Claim 77 (Previously Presented): An exposure method according to Claim 16, wherein said optical system includes a part of an illumination optical system to illuminate said mask and a projection optical system to transfer said pattern onto said substrate.

Claim 78 (Canceled).

Claim 79 (Currently Amended): An exposure apparatus according to Claim 61, wherein a transmittance of said optical system is obtained based on a ratio between an output signal ~~of~~ from said first sensor and an output signal ~~of~~ from said second sensor.

Claim 80 (Previously Presented): An exposure apparatus according to Claim 24, wherein said exposure condition includes an illumination condition to illuminate said mask, and the illumination condition includes one of a ring-shaped illumination and a modified illumination.

Claims 81-82 (Canceled).

Claim 83 (Currently Amended): An exposure apparatus according to Claim 45, wherein said time-varying prediction function has a period of time in which the operation of said apparatus is stopped as a parameter.

Claim 84 (Canceled).

Claim 85 (Currently Amended): An exposure apparatus according to Claim 46, wherein said exposure condition includes at least one of an illumination condition to illuminate ~~a~~ said mask ~~on which said pattern is formed~~, a transmittance of said ~~the~~ mask ~~on which said pattern is formed~~, a minimum line width of a ~~said~~ pattern formed on said mask, and a permissible exposure amount error of said exposure light with respect to said substrate.

Claim 86 (New): An exposure method according to Claim 16, wherein a transmittance of said optical system is obtained by multiplying a ratio between an amount of a part of said exposure light measured between said light source and said mask and an amount of said exposure light having passed through said optical system by a predetermined coefficient.

Claim 87 (New): An exposure method according to Claim 19, wherein a transmittance of said optical system is obtained by multiplying a ratio between an amount of a part of said exposure light measured between said light source and said mask and an amount of said exposure light having passed through said optical system by a predetermined coefficient.